

REMARKS

The Office Action of November 13, 2006 has been received and its contents carefully noted. By this response, none of the claims have been amended. Accordingly, claims 1-48 are currently pending in the application, of which claims 1, 12, 23, 35, and 44 are independent claims.

Reconsideration and withdrawal of all pending rejections in view of the following remarks is respectfully requested.

35 U.S.C. § 103 Rejection

Claims 1-3, 10-11, 35-16 and 42 are rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952. This rejection is respectfully traversed.

Japanese Patent No. JP 55077972 (hereinafter JP 972) teaches the use of providing scores to become crushing-initiation points. The scores are generated with a support plate 14 and piercing bars 13. Thereafter, a separate crushing is used to obtain the mold product. JP 972 does not teach using this process with any other process.

Japanese Patent No. JP 09182952 (hereinafter JP 952) is directed to a method and device for removing a mold and core from a casting. More specifically, the English language abstract of JP 952 describes the problem to be solved is to crush molding sand and remove it with ejection water from a casting. As shown by the figures and specifically Figure 8, the process set forth by JP 952 is directed to cleaning out molding sand from inside a hollow part.

Claim 1, on the other hand, uses multiple processes to fracture, degrade and dislodge the mold from a casting. This is contrary to the teachings of JP 952 which is merely directed to

a single process of ejecting the high-pressure water toward the casting and JP 972 that teaches to pierce and crush the mold.

Similarly, claim 35 recites the step of directing a fluid media at exterior walls of the mold. The teachings of JP 952 require injecting high-pressure water in a hollow part of the cast product as shown in Figure 8. Accordingly, claim 35 is not considered to be anticipated by the teachings of JP 952. Moreover, claim 35 further requires a step of subjecting the mold to a process. In this regard, claim 35 as taught in the disclosure includes another process for dislodging a mold from a casting. The process being used in conjunction with the step of directing the fluid media at exterior walls.

Noting that JP 972 does not disclose at least directing an energy flow, the Examiner alleges it would have been obvious to modify the teachings of JP 972 with the teachings of JP 952 in order to obtain the claimed invention. See Office Action, paragraph 3. The Examiner further argues that such a combination would result in the claimed invention and would reduce "cycling time." *Id.* There is not basis in the prior art for this statement.

This statement shows that the Examiner has made an improper hindsight reconstruction of the claimed invention through piecemeal prior art teachings. There is nothing in JP 952 or JP 972 that indicate that any further process is needed or that the taught process is somehow deficient. In other words, there is no motivation to combine these two references in the manner suggested by the Examiner. To do so is improper hindsight. The disclosure on the other hand teaches in the Summary that the claimed invention is a method "for enhancing the removal of sand molds."

The prior does not teach combining any of the various claimed processes for enhancing mold removal or any other reason. The cited prior art merely removes mold material from a

casting using the disclosed process. None of the prior art teach a unique combination of processes that provide enhanced mold removal as claimed.

Accordingly, it is respectfully asserted that JP 952 and JP 972 do not render obvious or anticipate the various features of at least independent claims 1 and 35.

Claims 12-15 and 21-22 are rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Vinton et al. This rejection is respectfully traversed.

The Examiner indicates that the combination of JP 972 and JP 952 fail to disclose explosive charges and the Examiner relies on Vinton et al. to teach such a feature.

In particular, Vinton et al. is directed to applying a gaseous composition into the voids of a porous shape inside of a chamber. This is shown in, for example, Figure 2. Next, Vinton et al. teaches that this gaseous material is allowed to explode and weaken the porous shape to allow it to be removed from the mold. Vinton et al. does not disclose an explosive charge. Vinton merely teaches an explosive gas.

Accordingly, the combination of JP 972 in view of JP 952 and further in view of Vinton et al. fails to teach each and every feature of the claims 12-15 and 21-22. A rejection under 35 U.S.C. § 103 based on obviousness cannot be properly maintained without a proper disclosure of each and every element and the motivation to combine the elements. Here the applied references fail to teach at least the use of an explosive charge.

Additionally, JP 972 and JP 952 fail to provide any motivation that would lead one of ordinary skill in the art to combine these references in a manner set forth in the Official Action for the reasons noted above with respect to claims 1-3, 10-11, 35-16 and 42.

Accordingly, the Examiner is respectfully requested to withdraw the rejection under 35 U.S.C. § 103.

Claims 23-27 and 33-34 are rejected under 35 USC 103(a) as being unpatentable over JP 972 in view of JP 952 and further in view of Heine et al. This rejection is respectfully traversed.

The Examiner indicates that the combination of JP 972 and JP 952 fail to disclose energy pulsation and the Examiner relies on Heine et al. to teach such a feature.

In particular, Heine et al. is directed to immersing the mold and casting into a liquid, such as oil, and then applying a shock wave from a pulse generator 26. This is in direct contrast to the claimed invention which desires to process the molding and casting while it is still hot in order to start the heat treatment process as soon as possible. Heine et al. is unable to provide that result in that once a mold has been placed into oil, it will be quickly cooled and will not be able to take advantage of the heated state that will allow for heat treatment to take place very quickly.

This is further substantiated by the fact that the energy pulsation that was recited in claim 23 is not the same as that type of energy pulse created by the pulse generator 26 of Heine et al. In particular, the energy pulse of the claimed invention as noted in claim 25 is a shock wave produced from the energy pulsation that comprises mechanical means, cannons, pressurized gases and electromechanical means and combinations thereof. In this regard, the pulse generator 26 of Heine et al. is an altogether different type of shock wave that is created only in a liquid medium such as oil and only through the use of a shock device such as the device 25 that is a spark gap with a reflector 24 as described in the Heine et al. patent.

In stark contrast, JP 972 and JP 952 are not immersion type processes. There is no motivation to combine JP 972 and JP 952 with the process of Heine. Additionally, JP 972 and JP 952 fail to provide any motivation that would lead one of ordinary skill in the art to combine the prior art in a manner set forth in the Official Action for the reasons noted above. The prior does not teach combining any of the various claimed processes for enhancing mold removal or any other reason. The cited prior art merely removes mold material from a casting using the disclosed process. None of the prior art teach a unique combination of processes that provide enhanced mold removal as claimed.

A rejection under 35 U.S.C. § 103 based on obviousness cannot be properly maintained without a proper disclosure of each and every element and the motivation to combine the elements. Here the applied references fail to provide any motivation that would lead one of ordinary skill in the art to combine the references in a manner set forth in the Official Action.

Accordingly, the Examiner is respectfully requested to withdraw the rejection under 35 U.S.C. § 103.

Claims 44-45 and 48 are rejected under 35 USC 103(a) as being unpatentable over either JP 952, Vinton et al. or Heine et al. in view of Legge et al. This rejection is respectfully traversed.

Legge et al. is directed to cooling molds through the use of high thermally conducting plates 1, end elements 2 and 13 and a cope 3. This is shown in for example in Figure 1 of Legge et al. Further Legge et al. discloses in Figure 9a a temperature versus time cooling curve for conventional gravity sand casting. Legge et al. is directed to changing the cooling time for molds.

Legge et al. is silent to any type of processing to remove the molds in the casting that are partially solidified. Legge et al. is directed more to increasing the speed of solidification of a casting.

There is no motivation to combine JP 952, Vinton et al. or Heine et al. in view of with the process of Legge et al. There is no motivation that would lead one of ordinary skill in the art to combine the prior art in a manner set forth in the Official Action for the reasons noted above because Legge et al. is not directed to mold removal.

Dependent Claims

Claims 4-7 and 37-39 are rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Pennock et al.

Claims 8 and 40 are rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Andrews.

Claims 9 and 41 are rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Schlegel et al.

Claim 16 is rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Vinton et al. and Schlegel et al.

Claims 17-19 are rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Vinton et al. and Pennock et al.

Claim 20 is rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Vinton et al. and Andrews.

Claim 28 is rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Heine et al. and Schlegel et al.

Claims 29-31 are rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Heine et al. and Pennock et al.

Claim 32 is rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Heine et al. and Andrew.

Claim 43 is rejected under 35 USC 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Legge et al.

Claim 47 is rejected under 35 USC 103(a) as being unpatentable over either JP 09182952, Vinton et al. or Heine et al. in view of Legge et al. and further in view of either Smetan et al. or Pennock et al.

Claim 46 is rejected under 35 USC 103(a) as being unpatentable over either JP 09182952, Vinton et al. or Heine et al. in view of Legge et al. and further in view of either Smetan et al. or JP 55077972.

Each of these rejections is traversed. Applicants assert that these dependent claims are allowable on their own merit and at least because they depend on one of independent claims 1, 12, 23, 35 or 44, which Applicants submit has been shown to be allowable.

CONCLUSIONS

Applicants submit that a full and complete response has been made to the pending Office Action and respectfully submit that all of the stated grounds for rejection have been overcome or rendered moot. Accordingly, Applicants respectfully submit that all pending claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is thus respectfully requested to pass the above application to issue.

Should the Examiner feel that there are any issues outstanding after consideration of this Reply/Amendment, the Examiner is invited to contact the Applicants' undersigned representative at the number below to expedite prosecution. Prompt and favorable consideration of this Reply/Amendment is respectfully requested. Applicants respectfully request that a timely Notice of Allowance be issued for this application.

Respectfully Submitted,



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